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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 10/706,968 | 11/14/2003 | Jeffrey T. Wetzel | 244051US6YA | 7489 |
| 22850 | 7590 | 09/22/2005 | EXAMINER | |
| OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. | | | DOAN, THERESA T | |
| 1940 DUKE STREET | | | ART UNIT | |
| ALEXANDRIA, VA 22314 | | | PAPER NUMBER | |
| | | | 2814 | |

DATE MAILED: 09/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|--------------------------------------|--------------------------------------|--|
| Office Action Summary | Application No. 10/706,968 | Applicant(s) WETZEL ET AL. | |
| | Examiner Theresa T. Doan | Art Unit 2814 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 July 2005.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 16-38 is/are pending in the application.
- 4a) Of the above claim(s) 23-35 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 16-22 and 36-38 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This application contains claims 16-22 drawn to an invention nonelected with traverse in Paper No. 01/12/05 and newly claims 36-38. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 16-22 and 36-38 are rejected under 35 U.S.C. 102(e) as being anticipated by Gaillard et al. (U.S. Pat. 6,500,773) of record.

Regarding claim 16, Gaillard (figures 4A-4E) discloses a process for forming an integrated circuit structure comprising:

forming a layer of dielectric material 402 on a substrate;

forming a layer of tunable etch resistant anti-reflective (TERA) material 404 (figure 4B, column 7, lines 50-55 and column 6, lines 41-55) on the layer of dielectric material;

forming a layer of light-sensitive material (408/304) on the layer of TERA material (404/302), wherein the optical properties of the light-sensitive layer (408/304) and the TERA layer (404/302) are inherently substantially the same because both of the light-sensitive layer (408/304) and the TERA layer (404/302) have the same wavelength less than about 250nm (column 2, lines 13-24); and

forming a damascene structure for a metal interconnect by using the layer of TERA material 404 as at least one of a lithographic structure for the formation of the interconnect structure, a hard mask, an anti-reflective coating, and a chemical mechanical polishing (CMP) stop layer (see figures 4D and 5E).

Regarding claims 17-18, Gaillard (figures 3D and 4D) further discloses a step of exposing the layer of light-sensitive material (408/304) to a pattern of radiation, wherein the forming the layer of TERA material (404/302) facilitates producing a pattern in the layer of light-sensitive material (408/304) substantially the same as the pattern of radiation; wherein the forming the layer of TERA material comprises providing a part of the lithographic structure for the formation of a metal interconnect for the device structure (figures 3D and 4D, column 2, lines 8-28, column 8, lines 18-26 and column 9, lines 27-29).

Regarding claim 19, Gaillard discloses wherein the forming the layer of TERA material comprises depositing the layer of TERA material using at least one of plasma enhanced CVD (column 4, lines 34-35).

Regarding claim 20, Gaillard (figure 4D) discloses wherein the forming a damascene structure comprises integrating a tunable anti-reflective coating with a single damascene structure.

Regarding claim 21, Gaillard (figure 5D) discloses wherein the forming a damascene structure comprises integrating a tunable anti-reflective coating with a dual damascene structure.

Regarding claim 22, Gaillard (figures 3D and 4D) discloses wherein the forming a damascene structure comprises integrating a tunable anti-reflective coating with a dual damascene structure formed using a method comprising at least one a via-first method, a full-via-first method, a full-via with no stop layer method, a trench-first method, and a buried via mask method.

Regarding claims 36-38, Gaillard (figure 4D) discloses a step of forming a damascene structure comprises using the layer of TERA material 404 as a hard mask, a sacrificial layer or a CMP stop layer for forming the damascene structure.

Response to Arguments

4. Applicant argues that Gaillard fails to teach or suggest the optical properties of the light-sensitive layer and the layer of TERA material are substantially the same because the etching resistant anti-reflective layer 404 is tunable.

This argument is not persuasive because following the reasons below:

First, it is noted that the anti-reflective layer as claimed is also tunable.

Therefore, Applicant fails to provide the reasons to support that why the tunable etch resistant anti-reflective layer as claimed can have the same optical properties as the light-sensitive layer, but not the tunable etch resistant anti-reflective as disclosed by Gaillard.

Second, the light-sensitive layer (408/304) and the TERA layer (404/302) of Gaillard reference would inherently have the same of the optical properties because both of the light-sensitive layer (408/304) and the TERA layer (404/302) have the same wavelength of less than about 250nm (column 2, lines 13-24).

The rest of applicant's arguments, addressed to the amended claims are considered in the rejections shown above.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Theresa T. Doan whose telephone number is (571) 272-1704. The examiner can normally be reached on Monday to Friday from 7:00AM - 4:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, WAEL FAHMY can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TD
September 13, 2005.


PHAT X. CAO
PRIMARY EXAMINER